

## CLAIMS

1. A receiver comprising:

a down converter for providing a received signal; and

5 a demodulator having at least two demodulation modes for demodulating the received signal, wherein one demodulation mode is hierarchical demodulation and another demodulation mode is layered demodulation.

2. The receiver of claim 1, wherein the demodulator is responsive to a demodulation mode signal that specifies which one of the number of demodulation modes is performed by  
10 the demodulator.

3. The receiver of claim 1 wherein the demodulator comprises:

an upper layer demodulator for processing the received signal to provide a demodulated upper layer signal;

15 an upper layer decoder for decoding the demodulated upper layer signal to provide a decoded upper layer signal;

an upper layer remodulator/reencoder responsive to the decoded upper layer signal for providing a reconstructed modulated upper layer signal;

20 a combiner for combining the received signal with the reconstructed modulated upper layer signal such that an upper layer signal component of the received signal is substantially reduced therefrom to provide a received lower layer signal;

a lower layer demodulator for processing the received lower layer signal to provide a demodulated lower layer signal;

25 a selector for providing a lower layer signal derived from either the demodulated lower layer signal or the demodulated upper layer signal; and

a lower layer decoder for decoding the lower layer signal to provide a decoded lower layer signal.

4. The receiver of claim 3, wherein the selector is responsive to a demodulation mode  
30 signal for selecting either the demodulated lower layer signal or the demodulated upper layer signal for use in deriving the lower layer signal.

5. The receiver of claim 4, wherein the selector is responsive to the demodulation mode signal for selecting one of a number of log-likelihood ratio (LLR) look-up tables for use in deriving the lower layer signal.

5 6. The receiver of claim 3, further including an equalizer disposed between the received signal and the combiner for equalizing the received signal.

7. The receiver of claim 1 wherein the demodulator comprises:

an upper layer demodulator for processing the received signal to provide a  
10 demodulated upper layer signal;

an upper layer decoder for decoding the demodulated upper layer signal to provide a decoded upper layer signal;

an upper layer remodulator/reencoder responsive to the decoded upper layer signal for providing a reconstructed modulated upper layer signal and a reconstructed encoded upper  
15 layer signal;

a combiner for combining the received signal with the reconstructed modulated upper layer signal such that an upper layer signal component of the received signal is substantially reduced therefrom to provide a received lower layer signal;

a combiner for combining the demodulated upper layer signal and the reconstructed  
20 encoded upper layer signal such that an upper layer symbol component of the demodulated upper layer signal is substantially reduced to provide a first demodulated lower layer signal;

a lower layer demodulator for processing the received lower layer signal to provide a second demodulated lower layer signal;

a selector for providing a lower layer signal derived from either the first demodulated  
25 lower layer signal or the second demodulated lower layer signal; and

a lower layer decoder for decoding the lower layer signal to provide a decoded lower layer signal.

8. The receiver of claim 7, wherein the selector is responsive to a demodulation mode  
30 signal for selecting either the demodulated lower layer signal or the demodulated upper layer signal for use in deriving the lower layer signal.

9. The receiver of claim 8, wherein the selector further includes a soft input generator for converting the selected signal into soft input data, which is then provided as the lower layer signal.

5           10. The receiver of claim 9, wherein the soft input generator is a log-likelihood ratio generator.

11. The receiver of claim 7, further including an equalizer disposed between the received signal and the combiner for equalizing the received signal.

10           12. The receiver of claim 1, wherein the demodulator provides at least a demodulated upper layer signal and a demodulated lower layer signal, the receiver further comprising:

an upper layer decoder for decoding the demodulated upper layer signal to provide a decoded upper layer signal; and

15           a lower layer decoder for decoding the demodulated lower layer signal to provide a decoded lower layer signal.

13. Apparatus comprising:

a television set for displaying video content; and

20           a multi-mode receiver coupled to the television set for receiving a signal conveying the video content, wherein the receiver includes at least a hierarchical demodulation mode and a layered demodulation mode.

14. The apparatus of claim 13, wherein the received signal is a satellite signal.

25           15. A method for use in a receiver, the method comprising:  
receiving a signal;

selecting one of a number of demodulation modes, wherein at least two of the number of demodulation modes are a hierarchical demodulation mode and a layered demodulation mode; and

30           demodulating the received signal in accordance with the selected demodulation mode.

16. The method of claim 15, wherein the demodulating step includes the steps of:

demodulating the received signal to provide a demodulated upper layer signal and a demodulated lower layer signal;

decoding the demodulated upper layer signal to provide a decoded upper layer signal;

selecting, as a function of the selected demodulation mode, either the demodulated  
5 lower layer signal or the demodulated upper layer signal for providing a lower layer signal,  
wherein the demodulated lower layer signal is selected if the demodulation mode is the  
layered demodulation mode and the demodulated upper layer signal is selected if the  
demodulation mode is the hierarchical demodulation mode; and

decoding the lower layer signal to provide a decoded lower layer signal.

10

17. The method of claim 15, wherein the selecting step includes the steps of:

selecting a log-likelihood ratio (LLR) look-up table (LUT) as a function of the  
demodulation mode signal; and

generating log-likelihood ratios from the LLR LUT as a function of the selected signal  
15 to provide the lower layer signal.

18. The method of claim 15, wherein the demodulating step includes the steps of:

demodulating the received signal to provide a demodulated upper layer signal and a  
demodulated lower layer signal;

20

decoding the demodulated upper layer signal to provide a decoded upper layer signal;

reencoding the decoded upper layer signal to provide a reencoded upper layer signal;

subtracting the reencoded upper layer signal from the demodulated upper layer signal  
to provide an encoded lower layer signal;

selecting, as a function of the selected demodulation mode, either the demodulated  
25 lower layer signal or the encoded lower layer signal for providing a lower layer signal,  
wherein the demodulated lower layer signal is selected if the demodulation mode is the  
layered demodulation mode and the encoded lower layer signal is selected if the demodulation  
mode is the hierarchical demodulation mode; and

decoding the lower layer signal to provide a decoded lower layer signal.

30

19. The method of claim 18, wherein the selecting step includes the step of generating  
log-likelihood ratios from the selected signal for providing the lower layer signal.

20. Apparatus comprising:

a demodulator for processing a multi-level modulation based received signal comprising at least a first signal layer and a second signal layer; and

at least one register for use in controlling a demodulation mode of the demodulator wherein at least one demodulation mode is a hierarchical demodulation mode and another  
5 demodulation mode is a layered demodulation mode.

21. Apparatus comprising:

a lead for receiving a multi-level modulation based received signal comprising at least a first signal layer and a second signal layer signal; and

10 a demodulator for processing the multi-level modulation based received signal;

wherein the demodulator has a number of demodulation modes and wherein at least one demodulation mode is a hierarchical demodulation mode and another demodulation mode is a layered demodulation mode.